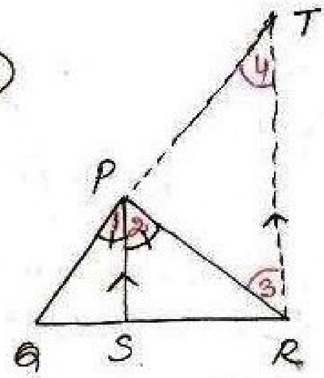
①



given - In figure PS bisects $\angle QPR$

To prove - $\frac{QS}{SR} = \frac{PQ}{PR}$

Const - draw $RT \parallel SP$ intersecting QP produced in T.

Proof $PS \parallel TR$

$\therefore \angle 2 = \angle 3 \ldots$ (i) (alternate in. $\angle$s)

$\angle 1 = \angle 4 \ldots$ (ii) (corres. angles)

$\angle 1 = \angle 2 \ldots$ (iii) (given)

From (i), (ii), (iii)

$\angle 1 = \angle 2 = \angle 3 = \angle 4$

In $\triangle PRT$

$\angle 3 = \angle 4$

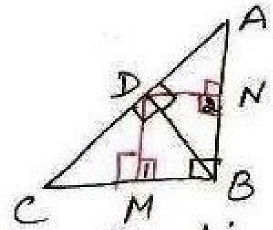
$\Rightarrow PT = PR$ (converse of isos. $\triangle$ prop)

In $\triangle QRT$, $PS \parallel TR$

$\frac{QS}{SR} = \frac{QP}{PT}$ (Basic prop theorem)

$\frac{QS}{SR} = \frac{PQ}{PR}$ ($\because PT = PR$)

②



given - In fig $\angle ABC = 90°$, $BD \perp AC$, $DM \perp CB$, $DN \perp AB$

To prove $DM^2 = DN \cdot MC$

$DN^2 = DM \cdot AN$

Proof - In ▭ DMBN

$\angle 1 + \angle ABC + \angle 2 + \angle MDN = 360°$

$90° + 90° + 90° + \angle MDN = 360°$

$\Rightarrow \angle MDN = 360 - 270$

$= 90°$

each angle of ▭ DMBN is $90°$

$\therefore$ ▭ DMBN is a rect.

$DN = MB$
$DM = NB$ (opp. sides of a rect.)

In rt $\triangle BDC$, $DM \perp CB$

$\therefore \triangle CMD \sim \triangle DMB$

$\Rightarrow \frac{CM}{DM} = \frac{MD}{MB}$ [*]

$\Rightarrow DM^2 = CM \cdot MB$

$= DN \cdot MC$ ($\because MB = DN$)

Sim. $DN^2 = DM \cdot AN$

* If a perpen. is drawn from the vertex of a right triangle to the hypot. then $\triangle$s on both sides of the perpen. are similar to whole $\triangle$ and to each other.